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construction innovation

NRC · CNRC

Study shows low public recognition of the temporal-three evacuation signal

The 1995 National Building Code of Canada requires that fire alarm signals sound the temporal-three (T-3) pattern, as defined by the ISO standard 8201 "Acoustics — Audible Emergency Evacuation Signal." It is likely that the T-3 pattern will become the standardized alarm signal heard around the world that unequivocally means "*evacuate the building immediately,*" to quote the standard. Although new and refurbished buildings have, for the past few years, been equipped with this new signal, it was not known whether the public recognizes this sound as an evacuation signal.

A recent study conducted by Dr. Guylène Proulx of IRC's Fire Risk Management Program and Dr. Chantal Laroche of the University of Ottawa's Department of Audiology assessed the public's recollection, identification, and perception of urgency of the T-3. Six warning signals were recorded on a CD: the T-3, a car horn, a reverse alarm (the warning sound made by a truck when it is backing up), a fire alarm bell, the slow whoop fire alarm, and an industrial warning buzzer, the sound indicating danger in an industrial setting. (To listen to these different signals, go to http://www.nrc.ca/irc/newsletter/v6no4/sounds.html.)

Members of the public were approached in buildings such as shopping centres, office buildings, libraries and airports, and were asked to listen through headphones to the six different sounds. After each signal, the interviewer asked the participants three questions:

1. "Have you heard this sound before?"
2. "What do you think this sound means?"
3. "How urgent do you feel this sound is on a scale from 1 to 10? 1 means the sound is not urgent at all and 10 means it is extremely urgent."

One of the researchers interviews a shopper about fire alarm recognition.

The first question tested the participants' **recollection** of the signal, the second their correct **identification** of the signal, and the third rated their perception of the **urgency** of the signal. It was heavily emphasized to participants that the sounds heard on the CD were used in and around large buildings, such as the one they were in at the time of the interview.

Highlights

Special Changes to codes
Preventing misuse of CCMC guides
Canadian initiatives in China
Next generation thermal insulation
New lighting handbook
Infrastructure planning

In total, 307 participants were interviewed for the study. Results showed a significant difference with respect to the various signals and how often participants said they could recall having heard them. The car horn was the signal recalled most often by participants (97% of the participants), followed by the reverse alarm (91%), the buzzer (81%), the T-3 (71%), the bell (58%) and the slow whoop (52%). (See Table 1.)

However, it is important to note that respondents who said they had heard a signal before did not necessarily identify it correctly. In fact, the T-3 was identified correctly—that is, as a fire or evacuation alarm—only 6% of the time. The car horn was identified correctly 98% of the time, the reverse alarm 71%, the bell 50%, the slow whoop 23%, and the buzzer 2% of the time. (See Table 2.)

Although participants often reported that they had heard the T-3 before, they could rarely correctly identify it as a fire alarm or evacuation signal. In fact, the T-3 was usually associated with domestic signals such as that of a busy phone or the sound of an alarm clock.

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2007-03605/

Special Changes to the National Building Code approved by the Commission

Changes to the national model codes go through a thorough process of evaluation and development by the permanent standing committees of the Canadian Commission on Building and Fire Codes (CCBFC). These committees of technical experts bring a broad range of expertise to this work.

As part of the process, proposed changes to the codes undergo public review. Typically, this public review takes place every five years. When a standing committee is satisfied that a particular change can be justified and will resolve the issue it is intended to address, it recommends the adoption of the change to the Commission.

All changes to the code are published with an explanation of why each change has been made. As well, Canadian Codes Centre staff hold seminars across the country to answer questions and solicit comments.

This is how changes to the code normally get made. However, under some circumstances the Commission may forgo immediate public review and issue a Special Change to the codes. This action is taken when a potential danger to safety or health must be addressed quickly, or when there are undue restrictions on the use of materials, equipment or construction procedures that could cause economic hardship. The Special Changes are subject to public scrutiny during the next public review cycle.

The Commission recently approved the following Special Changes to the National Building Code 1995 (NBC).

Window standard

The Canadian Standards Association standard A440-1999 "Windows" has been revised. In the process, a requirement for a minimum level of energy performance of windows has been included in the standard. Because energy efficiency is not currently recognized as an objective of the NBC, the Commission agreed to a Special Change that introduces a limitation to the referenced standard: New Sentence 9.7.2.1.(2) states that windows need not conform to the standard's energy performance requirement.

For information about this code change, contact Ms. Adaire Chown at (613) 993-0352, fax (613) 952-4040, or e-mail adaire.chown@nrc.ca.

Snow loads

The Canadian Sheet Steel Building Institute has argued that with respect to snow loading, the current wording of the NBC imposes more stringent requirements on structures not built of light wood framing than on those built of light wood framing. It does this by applying higher load factors to engineered structures (such as those using light steel framing) with the result that they become more expensive than they need be. This situation creates an artificial restriction on the use of alternative materials. The Special Change approved by the Commission rectifies this situation.

For more information about this change, contact Mr. Michel Lacroix at (613) 993-0056, fax (613) 952-4040, or e-mail michel.lacroix@nrc.ca.

Loose-fill insulation

When the Standing Committee on Houses considered updating the NBC to reference the new standard CAN/ULC-S703-01 "Standard for Cellulose Fibre Insulation (CFI) for Buildings," replacing discontinued standard CAN/CGSB-51.60, it noted that the new standard permits a maximum slope of 4.5 in 12 while the NBC Sentence 9.25.2.4.(2) limits the slope to 2.5 in 12. The standing committee felt that delaying the change to the new standard or not revising the code to reflect this change would constitute an unacceptable barrier to the use of materials and hence a significant financial loss to the cellulose insulation industry. The Commission agreed with the view of the standing committee and approved a Special Change to permit an increase in the maximum slope to 4.5 in 12.

For more information about this code change, contact Mr. Michel Lacroix at (613) 993-0056, fax (613) 952-4040, or e-mail michel.lacroix@nrc.ca.

The Commission also approved a Special Change to the National Plumbing Code (NPC):

Water heaters

The current wording of the NPC permits users to choose between a temperature relief valve and a temperature sensitive energy shut-off

valve to prevent excessive temperatures (greater than 99°C) in storage-type water heaters. However, if the controlling thermostat fails, a safety hazard can be created when the pressure relief valve activates, releasing steam. In order to eliminate this safety hazard, the Commission has approved a Special Change requiring the installation of both a temperature sensitive valve and a pressure relief valve on this type of heater.

For information about this code change, contact Mr. Raman Chauhan at (613) 993-9633, fax (613) 952-4040, or e-mail raman.chauhan@nrc.ca.

Important Special Change—snow loads on arch roofs

A potentially significant design shortcoming was brought to the attention of the Standing Committee on Structural Design at its 36th meeting held in October 1999. A respected consulting engineer had submitted a report indicating that the current 1995 NBC snow load requirements can produce an unsafe condition in arch roof structures with a rise to span ratio greater than 1 in 10.

The current code requirements for snow load state that only those arch roofs with a rise to span ratio equal to or less than 1 in 10 must be designed for both the specified uniform snow load on the entire roof surface and the partial snow loading stipulated in Sentence 4.1.7.2.(2) of the NBC 1995. The consulting engineer's report indicated that the partial snow load should also be applicable to roofs whose rise to span ratio is greater than 1 in 10.

To respond to the concern raised by this report, the Canadian Codes Centre engaged the services of a noted snow and wind load specialist to model the arch roofs and provide recommendations to the Standing Committee on Structural Design. Based on the specialist's recommendations, a Special Change has been approved to remove the limiting criteria of a rise to span ratio for arch or curved roofs in Sentence 4.1.7.2.(2) of the NBC 1995 for the unbalanced snow load condition. In addition, the corresponding Figures H-2(a) and H-2(b) in the Structural Commentaries to the NBC 1995 will be altered to comply with the recommendations.

For further information about this code change, visit the CCBFC Web site at http://www.ccbfc.org/ccbfc/home_E.shtml or contact Ms. Cathy Taraschuk at (613) 993-0049, fax (613) 952-4040, or e-mail cathy.taraschuk@nrc.ca.

Registry of Product Evaluations

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http://www.nrc.ca/ccmc

Codes-related Web sites

Canadian Commission on Building and Fire Codes
http://www.ccbfc.org

Canadian Codes Centre
http://codes.nrc.ca

Provincial/Territorial Committee on Building Standards
http://www.pcbs.org

CCMC acts to prevent its technical guides from being misused

CCMC has recently taken action to prevent its technical guides from being misused by introducing a technical guide that is manufacturer- and product-specific. By taking these measures, CCMC will be able to limit:

- the use of technical guides as standards;
- improper compliance claims by parties not under contract with CCMC; and
- the dissemination of parts of technical guides, creating confusion about their source.

When manufacturers want to enter the marketplace with an innovative product, they often encounter difficulties with regulations and building codes. They need to demonstrate compliance to regulators through equivalent performance of their products.

CCMC facilitates the introduction of new technologies to the market by evaluating them to determine whether they meet the intent of applicable building codes, with technical guides playing a key role in this evaluation process.

The technical guide outlines the performance criteria the product must meet and the testing procedures that must be followed. When no recognized testing procedures exist, new ones are developed as part of the guide. The guide is then provided to the manufacturer, who is responsible for having the tests conducted in a laboratory recognized by CCMC.

Once the testing is complete, CCMC reviews the test results. If the product complies with the technical guide requirements, CCMC issues an evaluation report that includes detailed test results, a full description of the product, and its use and limitations. The evaluation report is copyrighted.

Until this year, the technical guides issued by CCMC had a generic cover page that reflected the type of product to be evaluated and its Masterformat reference number. To discourage the misapplication of its technical guides, CCMC has modified them by introducing a client- and product-specific cover page and the watermarking of the document with the product's name. The cover page also provides the CCMC evaluation officer's name and the expected completion date for the required testing, which is usually within a year of the date of issuance.

CCMC believes these changes will help avoid confusion, both for manufacturers seeking market acceptance and for users (building officials, architects, engineers and others) who rely on CCMC evaluation reports.

Specific questions can be directed to Dr. John Flack at (613) 990-8518, fax (613) 952-0268, or e-mail john.flack@nrc.ca.

What's new on the roof?

CCMC frequently interacts with industry to get new and innovative products to market. In this role, it sees tomorrow's product today.

In the roofing industry a quiet revolution has been taking place, resulting in changes that will bring a wider choice of products and finishes to the consumer. The manufacturers of these products are striving to provide not only greater choice but also increased durability and improved performance.

What are these new, innovative products?

Recycled materials

For the environmentally conscious consumer, there is a wide variety of roofing products, such as tiles and panels, that incorporate polymer waste materials from industry, consumers' blue boxes, and used car tires.

The polymers are given a "new life" by grinding them, then mixing them with a bonding polymer. The resultant recycled material is then moulded, extruded or pressed into a number of different geometric sizes, shapes and profiles, ranging from single tiles to complex interlocking panels. These new products are installed using conventional techniques—that is, galvanized nails—with no need for any pre-drilling.

CCMC has been approached by several manufacturers of these products, who are aiming at life expectancies much greater than those of traditional roofing products. Any technical guides developed by CCMC to evaluate these products would address the issue of overall durability as well as the issues of composition and performance; for example, how a product is affected by wind-driven rain, weathering and snow loads. The guides would also

House with metal roofing

Continued on page 9

Revising China's building codes opens door for Canadian industry

The Canadian construction industry has long known that it has a lot to offer, and not only within its own borders. Homes that are energy efficient, affordable, durable, safe, and suitable for a wide range of needs are required the world over. According to Team Canada (see box), one country in particular—China—has recently emerged as an important export destination for Canadian building products and construction services.

Fuelled by a number of factors, including an increased per-capita income and standard of living, China has experienced a dramatic growth in its construction industry. The potential for export to the world's largest market is tremendous, and Team Canada is working closely with the Chinese government to maximize the opportunities for Canada's construction industry.

The first step is to increase acceptance of Canada's building products and services. China already has a tradition of wood construction, but the concept of wood-frame housing, as opposed to timber or post and beam type construction, is still new to the general public. Through its participation in the committees responsible for revising Chinese building codes, Canada has the chance to introduce North American wood-frame technologies into the Chinese Timber Structural Design Code (JBJ-5). As well, Canada is offering suggestions on fire protection aspects of the codes.

Team Canada

Team Canada, led by the Prime Minister and with representatives from government and the private sector, was formed to increase trade and help Canadian companies find opportunities in new markets in other countries by sharing our technologies and expertise with them. As part of its mission to China, Team Canada hopes to facilitate the introduction of new technologies that could enhance the quality of Chinese housing.

Progress to date

A building code sub-committee (see box) has been formed under a memorandum of understanding between Canada Mortgage and Housing Corporation (CMHC) and China's Ministry of Construction. This sub-committee has been given the task of increasing the export of Canadian construction products to China through its participation in the revision of China's construction codes.

The inaugural meetings of the China-Canada building code sub-committee took place in Beijing, China, in July 2000. At the meetings, the Canadian delegation was made aware of the Chinese building code process and the potential opportunity for including light-frame construction and wood-framing products in the revised Chinese building codes.

With the participation of Dr. Chun Ni of Forintek Canada Corp. as a member of the Chinese Timber Structural Design Code committee, a major breakthrough was achieved: members agreed to separate traditional timber structures from Canadian wood-frame construction. The result will be the creation of a chapter in the code that includes both engineered and conventional wood-frame buildings, similar to Parts 4 and 9 of Canada's National Building Code. A separate chapter on fire protection will also be included.

China-Canada building code sub-committee

The building code sub-committee is chaired by John Berndt, Manager, Canadian Construction Materials Centre (CCMC) at IRC, and includes active members from: CMHC; Natural Resources Canada, Canadian Forest Service; Department of Foreign Affairs and International Trade; Forintek Canada Corp.; Council of Forest Industries; and the Export Council of Canadian Architects.

Initiatives such as those of the building code sub-committee greatly enhance the potential for export of all Canadian construction products. To date, only the wood products industry has expressed interest in the Chinese marketplace, but Team Canada welcomes inquiries from other segments of the construction industry that are interested in tapping into this tremendous potential.

For more information about this initiative, contact Mr. Alphonse Caouette at (613) 993-6917, fax (613) 952-0268, e-mail alphonse.caouette@nrc.ca.

Fire risk management

Study shows low public recognition of the temporal-three evacuation signal

Continued from cover page

When asked to rate the urgency of each of the signals, participants rated the T-3 as the least urgent of all six signals, giving it an overall rating of 3.97 on a scale of 1 to 10 (10 indicating "extremely urgent"). The buzzer, car horn and reverse signals received urgency ratings between 4.91 and 5.60, while the slow whoop obtained a rating of 6.01, and the bell 7.17. (See Table 3.) It should be stressed that, generally, when a participant identified a signal as a fire alarm, the urgency rating significantly increased. This result demonstrates a clear link between the meaning attached to a signal and the perceived urgency of that signal.

Table 1. Number of occupants who said they had heard a signal before

Signal	Participants (N=307)	Recollection of signal by participants (% of participants)
Car horn	297	97
Reverse alarm	280	91
Buzzer	249	81
T-3	219	71
Bell	177	58
Slow whoop	159	52

Table 2. Number of participants who correctly identified each signal

Signal	Participants (N=307)	Correct identification of signal (% of the time)
Car horn	302	98
Reverse alarm	218	71
Bell	155	50
Slow whoop	71	23
T-3	17	6
Buzzer	6	2

Table 3. Perceived urgency of each signal

Signal	Urgency (as rated by participants on a scale of 1 to 10, with 10 indicating "extremely urgent")
Car horn	4.93
Reverse alarm	5.60
Bell	7.17
Slow whoop	6.01
T-3	3.97
Buzzer	4.91

The project findings suggest that considerable public education is necessary to improve people's recognition of the T-3 signal. They also suggest that it is unrealistic to believe that building occupants will start to evacuate a building as soon as they hear the T-3 signal, even if it is recalled and identified correctly as a fire alarm. Supplementary information conveyed by staff or, where provided, through a voice communication system, will always be needed to confirm to occupants that evacuation (or relocation to an area of refuge in the building) is needed.

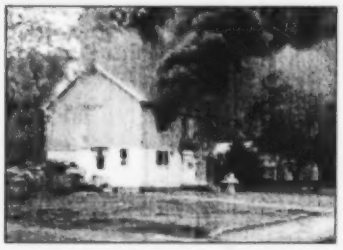
NRC has notified the Canadian Council of Fire Marshals and Fire Commissioners and the Canadian Commission on Building and Fire Codes as to the results of this study and will provide support to any programs that may be initiated.

Specific questions can be directed to Dr. Guylène Proulx at (613) 993-9634, fax (613) 954-0483, or e-mail guylene.proulx@nrc.ca.

This study was jointly funded by IRC and Siemens Building Technologies Limited.

Newsbrief

Setting a B.C. town on fire: IRC conducts valuable research



A house goes up in flames in Kemano, B.C. in aid of fire research.

An entire Canadian town has gone up in flames, and IRC was on hand to take full advantage of the smoke, flames, and research opportunities. The lessons learned there could help protect Canadians from fire for years to come.

Kemano, B.C. was a company town built 50 years ago by Alcan Smelters and Chemicals Ltd. to support its hydroelectric station. When the station became essentially automated, making the town obsolete, an idea was born. The deserted town was donated to British Columbia's fire services for training and research, and a team from IRC went along, too.

In addition to becoming a proving ground for firefighting, 40 abandoned houses filled with donated furniture and props made an ideal, full-scale experimental site. The IRC Kemano project team completed two complex rounds of tests: one to study the response of smoke detectors in houses, and the other to evaluate the performance of residential plastic sprinkler systems. The one-year project is now complete, and IRC researchers are analyzing the results.

The project was a partnership success story thanks to the cooperation between the Office of the Fire Commissioner of B.C., Alcan, and the National Research Council; and thanks to the financial support of Underwriters' Laboratories of Canada and Wirsbo Canada Ltd.

Specific questions can be directed to Dr. Joseph Su at (613) 993-9616, fax (613) 954-0483, or e-mail joseph.su@nrc.ca.

The new wave in thermal insulation

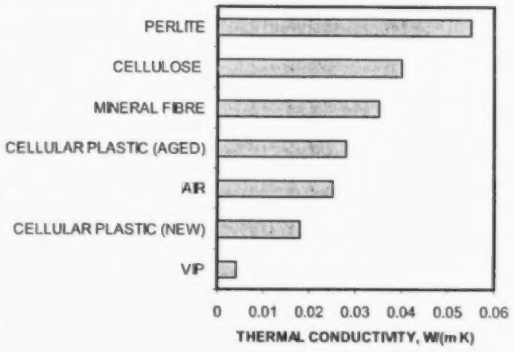
No matter where one lives in Canada, thermal insulation is an essential part of the environment—not only for the obvious warmth it provides during Canadian winters, but also for its economic benefits through energy savings.

Propelled by the energy crisis in the 1970s, today's insulation industry in North America has become a multi-billion dollar enterprise. Huge technological advances have been made in the search for ever-better thermal products; various fibres, loose fills and cellular plastics have all captured a part of the market. But the real future of thermal insulation may lie in a new technology that outperforms traditional insulating materials ten to one.

Vacuum Insulated Product (VIP) is a quantum leap forward in thermal insulation (see *Construction Innovation* Volume 6, Number 2). It offers exciting opportunities for both new and existing buildings: roomier living and working spaces can be designed without sacrificing comfort or energy efficiency; and existing buildings can be retrofitted to dramatically improve their efficiency with minimal loss of space. With research already underway to prove its economic viability in building applications, VIP is emerging as one of the most promising choices in thermal insulation for the 21st century.

How it works

The effectiveness of traditional air-filled insulating materials is limited by the thermal conductivity of the air trapped in the material as well as by the properties of the insulating material itself. Cellular plastic insulating materials filled with gases can provide higher thermal resistance than traditional air-filled insulating materials, at least initially, because the gas has a lower thermal conductivity than air. But the intrusion of atmospheric air over the course of the service life of cellular plastic insulating materials diminishes their thermal resistance. In VIP technology, the creation of near-vacuum conditions reduces thermal conductivity through the insulating material.



Thermal conductivity of VIP compared to several common insulating materials. (Please note that the graph represents current, practical lower limits of thermal conductivity for the generic insulation materials.)

VIP uses a porous solid matrix with low density (called the core) and an impenetrable film as its essential components. The core can be made of materials such as fumed silica, precipitated silica gel, polyurethane foam, or extruded polystyrene and can be of any shape and thickness. It is evacuated to approach vacuum and then tightly sealed with the film to hold the vacuum for many years.

The very latest technologies use "getters" within the panels to capture any gas or water molecules that happen to wander into the vacuum during the manufacturing process and over the course of the service life, further increasing the longevity of the VIP. The result: one centimetre of VIP can match the performance of ten centimetres of glass fibre insulation. The potential is obvious—and enormous.

To date, VIP panels as large as 1 m x 3 m x 25 mm have been successfully manufactured. Current uses that benefit from the technology include insulated shipping containers, refrigeration units, cold storage facilities, and storage chambers. And an International Energy Agency annex (an international collaboration of researchers) on high performance thermal insulation systems is already studying VIP's building applications, with results expected in three to four years from demonstration projects now underway in a number of countries around the world.

Specific questions can be directed to Dr. Kumar Kumaran at (613) 993-9611, fax (613) 998-6802, or e-mail kumar.kumaran@nrc.ca.

IRC is leading the Canadian effort to develop and commercialize VIPs and invites those involved in the insulation industry or in large-scale building projects to join. Participation will provide an opportunity to get in on the ground floor of this initiative, which will address both technical and marketability issues.

If you are interested in learning more about this project and how you can get involved, please contact Mr. Harris Cunningham, Marketing, (613) 991-2987, fax (613) 993-3142, or e-mail harris.cunningham@nrc.ca.

New handbook will help designers make better lighting choices

The latest edition of the *IESNA Lighting Handbook*, published in 2000, contains an important change—a new chapter focusing on lighting design called "Quality of the Visual Environment."

The *Handbook*, published by the Illuminating Engineering Society of North America, is the principal source for information about the science and art of lighting, helping lighting designers, engineers, and facilities managers identify their lighting needs and make appropriate lighting choices.

"People misunderstood the previous editions," according to IRC's Jennifer Veitch, a member of the task force that wrote the new chapter. "There was an extensive procedure for calculating illuminance—the quantity of light falling on a surface—which created the erroneous impression that quantity of illumination was the only important criterion for good lighting." The new chapter tackles, instead, the resulting visual environment—vision issues, human factors, task-specific lighting concerns and system integration.

IRC researchers played a large role in developing a model of lighting quality that was eventually incorporated into the *Handbook*. This model takes into account three critical areas involved in making lighting choices, with an emphasis on the first:

1. individual well-being (visibility, task performance, health and safety, mood and comfort, and aesthetics)
2. economics (installation, maintenance, operation, energy, and environment), and
3. architecture (form, composition, style, codes and standards).

Without a balance among these areas, the value of the lighting choice will be compromised.

The new chapter recognizes the importance of the appropriate quantity of light, but goes far beyond it. "Quantity is really an aspect of quality," confirms Veitch. "If there is not enough light to see important details, then a basic human need has not been met." Seeing small details, however, is not the only purpose for lighting.

Too much light in the wrong places is as detrimental as insufficient lighting. This excessive light, or glare, can be broken down into three separate categories: direct or reflected glare, disability glare and overhead glare. Key elements involved in solving these problems, according to the *Handbook*, are:

- judicious positioning of computer monitors and choice of luminaires to avoid glare on screens;
- controlled daylight integration to avoid heat gain and excessively high luminance; and
- careful consideration of luminance distribution to avoid both shadows and excessive uniformity.

Lighting should highlight points of interest. "It's a matter of providing higher than average luminance for a particular object while at the same time avoiding glare," says Veitch. Modelling—that is, making the three-dimensional characteristics of objects visible—she notes, is also important; for instance, well-directed light will make faces visible, so that we can see and interpret facial expressions that communicate as much as words.

The *Handbook* does not leave people to figure out all the issues by themselves. A critical part of the new edition is the Lighting Design Guide, which provides guidance on lighting for specific tasks. This section is organized by type of application:

1. interior
2. industrial
3. outdoor
4. sports and recreation
5. transportation
6. emergency, safety and security.

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These six application types are further broken down by activities, tasks or places. Columns in the table identify lighting design issues and pinpoint those that are most important for a particular application, using colour to code four different levels of importance. In addition, the Lighting Design Guide includes all the necessary definitions as well as annotated illustrations of different types of spaces (e.g., offices, factories).

To determine recommended illuminances for vertical and horizontal surfaces, lighting selection guidelines for various tasks are included, with references to other chapters that can assist designers in choosing the right lighting for the particular circumstances.

The 9th edition of the *IESNA Lighting Handbook* is available from the Illuminating Engineering Society of North America, www.iesna.org.

Specific questions can be directed to Dr. Jennifer Veitch at (613) 993-9671, fax (613) 954-3733, or e-mail jennifer.veitch@nrc.ca.

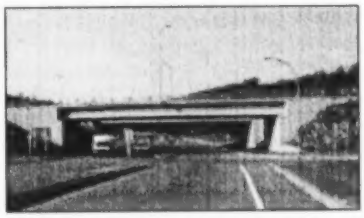
IRC set to launch Municipal Infrastructure Investment Planning (MIIP) project

Managers of infrastructure assets, such as federal and provincial government departments, municipalities and universities, have to manage a diversified set of built assets, from complex underground networks to buildings, roadways, and parks. However, it is difficult to protect these assets from deterioration that can occur as a result of ageing, or climatic or geological factors. Shrinking funds for the repair of such assets compound the problem, with the result that some components of urban infrastructure systems are neglected and receive only remedial treatment.

Asset managers are faced with many challenges regarding when and how to inspect, maintain, repair and renew existing facilities in a cost-effective manner. There are few tools in the form of standards, guidelines, technical literature or computer software to assist them in their decision-making. While there are now many information technology (IT) "solutions" claiming to address the needs of organizations with mixed assets, it is difficult for organizations to evaluate these for suitability.

The National Research Council Canada and its collaborators in the MIIP project will develop and adopt a framework for organizing information and knowledge related to municipal infrastructure investment planning. The outcomes of the project will include:

- surveys of IT tools currently available;
- asset management case studies;
- development of an IT framework for asset management;
- development of generalized techniques for predicting deterioration of assets and determining maintenance project priorities;



Federal, provincial and municipal governments have to manage a broad range of infrastructure assets, including roadways and bridges.

- guidelines and manuals that document the "state-of-practice" in strategic asset management.

For more information, visit www.nrc.ca/irc/uir/miip.

If you wish to participate in this consortium project, please contact Dr. Dana Vanier at (613) 993-9699, fax (613) 954-5984, or e-mail dana.vanier@nrc.ca.

What we're hearing

Climate change action plan launched

Around the world there is much discussion of global warming and its implications for the earth's natural environment. As a signatory of the Kyoto Protocol, Canada committed itself to meeting certain targets and has launched an effort to ensure that federal government departments and agencies achieve these goals.

For information on climate change and on Canada's efforts to meet its targets, visit these Web sites:

General information:
http://www.climatechange.gc.ca
Office of Energy Efficiency:
http://oee.nrcan.gc.ca
Environment Canada's Green Lane:
http://www.ec.gc.ca
Health Canada: http://www.hc-sc.gc.ca
Transport Canada: http://www.tc.gc.ca
Public Works and Government Services Canada:
http://www.designinggreen.com
http://www.cdwaste.com

What's new on the roof?

Continued from page 4

consider the issue of quality control; for example, ensuring that there are manufacturing methods in place for achieving product consistency. (See related article on CCMC technical guides on p. 4.)

Metal roofing

The sheet metal roofing panel industry has also been working on a number of new products that provide a greater choice of colours and patterns. Manufacturers of these products hope to achieve increased life expectancy (relative to traditional metal roofing) through a combination of new metal alloys protected by advanced anti-corrosive primers and high-performance finish coatings.

Advances in the metal forming process have led to roofing panel patterns simulating slate, clay tiles, wood shakes, stone and granular finish. As well, metal-formed panels are now being produced with a low profile, which facilitates direct attachment to the roof deck. The low profile panels are also intended to do a better job of visually matching the products they simulate, and to be less prone to deformation. They are designed with interlocking edges on all sides, making it easier to attach them without battens—typically this is done with a number of hidden clips.

To date, CCMC has completed the evaluation of only one of these products (see CCMC Evaluation Report No. 13011-R); however, other evaluations are planned or in progress.

For more information about these new types of roofing product, contact Dr. John Flack at (613) 990-8518, fax (613) 952-0268, or e-mail john.flack@nrc.ca.

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Upcoming events

2002

JANUARY

13-17
Transportation Research Board
81st Annual Meeting. Washington.
http://www4.trb.org/trb/annual.nsf

30-31
Construct Ottawa. Ottawa.
http://www.constructottawa.com

FEBRUARY

10-13
National Roofing Contractors Association (NRCA) 115th Annual Convention and Exhibit. San Antonio, TX.
http://www.nrca.net/programs/convention/2002/default.asp

24-27
Rural Ontario Municipal Association/ Ontario Good Roads Association Combined Conference. Toronto. www.ogra.org

MARCH

4-5
Provincial/Territorial Policy Advisory Committee on Codes. Quebec City.
Contact: John Archer at (613) 993-5569; e-mail john.archer@nrc.ca

10-13
AWWA Infrastructure Conference and Exhibition. Chicago.
http://www.awwa.org/calendar/cgi-bin/calendar.cgi?d=10&m=03&y=2001&id=992&mt=04&yt=2002

17-20
9th International Conference on Durability of Building Materials & Components. Brisbane, Australia. http://www.dbce.csiro.au/9dbmc/conference/index.cfm

APRIL

2-3
Construct BC. Vancouver.
http://www.constructcanada.com

2-5
Third International Symposium on 3D Finite Element for Pavement Analysis, Design & Research. Amsterdam. http://www.3dfem.org/

4-6
Structures 2002 Congress and Exposition. Denver. http://www.asce.org/conferences/structures2002/index.html

21-26
ACI Convention Spring 2002 – A Concrete Driven Renaissance. Detroit.
http://www.aci-int.net/index.htm

29-30
2nd International Workshop on Developments in Repair Materials, Techniques and Maintenance Strategies for Infrastructure and Buildings. Toronto. Contact: Noel Mailvaganam at (613) 993-9713, fax (613) 954-5984, or e-mail noel.mailvaganam@nrc.ca

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